
Knowledge management driven leadership, culture and innovation success – an integrative model

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Structured Abstract

Purpose – This article examines the relation between knowledge management (KM) driven leadership, culture and innovation success of knowledge-intensive small and medium sized companies. By building on the previously reported research on leadership, culture, innovation, and knowledge management, we synergistically integrated KM-driven leadership and innovation success while exploring the meditational role of culture in that.

Design/methodology/approach – A conceptual model comprising three constructs was developed, namely KM-driven leadership, culture and innovation-based success of the company. To examine the conceptual model, quantitative research was conducted among selected companies from the SMEs offering knowledge-intensive business services. The companies were contacted by telephone and interviews were carried out with 111 key informants. The data was later analysed with exploratory and confirmatory statistical methods. We applied structural equation modelling techniques (SEM) with *Mplus* 7.2 software package to investigate the effects of KM-driven leadership on culture, and consequently its effect on innovation-based success of the company. To investigate the meditational role of culture between KM-driven leadership and innovation-based success of the company a *post-hoc* analysis was undertaken.

Originality/value – On the basis of the previous studies analysis, the following research gap has been identified. How does leadership based on knowledge management influences the innovation success of companies and what is the role of culture in this relation? By answering this question, the study contributes to the building of literature on the above topic twofold. First, it analyses the influence of KM-driven leadership in the creation of organizational culture, which in turn contributes to the innovation success of

the company. Second, this research pioneers in that it explores the mediational role of culture among KM-driven leadership and innovation success. The results of the mediation analysis confirm that culture fully mediates the relationship of KM-driven leadership with innovation success.

Practical implications – The paper proves the relation between KM-oriented leadership, culture and innovation-based success of the company. The analysis of the conceptual model confirms that culture mediates the relationship of leadership with innovation success. It highly contributes to the understanding of these phenomena in the context of small and medium-sized companies offering knowledge-intensive business services - still a topic at its early stage of research.

The study also shows that KM-oriented leadership is a very important factor helping in the achievement of innovation success by companies. The relationships examined indicate the potential areas on which SME managers and executives should concentrate to achieve better innovation results.

Keywords – leadership, culture, innovation success, KIBS companies, mediation analysis

Paper type – Research Paper

1 Introduction

Ability to innovate has become one of the key determinants of firms' competitiveness. It is therefore not surprising that a growing number of companies search for ways to become more innovative. This topic has also attracted a considerable attention of researchers who examine innovation and its management from a vast number of perspectives (e.g. Gray, 2006; Wang et al., 2010; Consoli and Elche-Hortelano, 2010; Taminiau, Smit and de Lange, 2007).

Apart from a research stream devoted directly to innovation and innovation management, there is a bunch of research examining various types of factors that could potentially influence and support firms' innovativeness, like for example leadership, culture or knowledge management (e.g. Nguyen and Mohamed, 2011; Schein, 2004; Ogbonna and Harris, 2000; Sarros et al., 2011; Birasnav, 2014; Donate and Sánchez de Pablo, 2015). For example, Sarros et al. (2011) examined the relationships between leadership vision, organizational culture, and support for innovation in various types of organizations. In the most recent study carried out by Donate and Sánchez de Pablo (2015), knowledge management practices were found to mediate the effect of knowledge-oriented leadership on innovation performance. In the study of Nguyen and Mohamed (2011) the authors confirmed that leadership is positively related to KM practices with

culture as a mediating element. Also Schein (2004) perceives the two concepts of leadership and culture as interlinked ones, hardly understood standalone. Another study of Ogbonna and Harris (2000) investigated the relationship between leadership style and performance, mediated by organizational culture.

Albeit the literature describing innovation and factors that potentially have influence on it is quite extensive, it is still insufficient, especially with regard to smaller entities. To the best of authors' knowledge, so far no research has been reported on the mediation role of culture between KM-driven leadership and innovation success.

This study aims to fill this research void by examining the relation between knowledge management (KM) driven leadership, culture and innovation success of knowledge-intensive small and medium sized companies.

Keeping the above objectives in mind, this paper is organized as follows. In the next section, conceptual framework and hypotheses are proposed. The third section is devoted to methodology, i.e. sample, procedure and measurements are described there. It is followed by an analysis of the main results. The last section discusses some implications and research limitations, as well as concludes on the study results.

2 Conceptual framework and hypotheses

The proposed conceptual model is based on the assumption that innovation success depends on KM driven leadership with culture mediating this relation.

The literature review is presented in the following stages. Firstly, the analysis of studies on leadership and KM-driven leadership is presented. Secondly, various aspects of innovation and innovation success are examined. Thirdly, studies devoted to culture are overviewed. At each stage of analysis, potential links between the three aspects are identified.

KM-driven leadership

Leadership can be defined as a way of inspiring other people (e.g. co-workers) to work hard for the purpose of accomplishing crucial tasks (Dessler, 2001) or facilitating others' performance (Sarros et al., 2011). It can be therefore stated that leadership is

based on a clear approach to managing employees and enhancing them to follow the leader in the realization of company's goals (Donate and Sanchez de Pablo, 2015).

Leaders are claimed to set the example for other employees in the organization and therefore, they directly influence organization's culture (DeTienne et al., 2004). These are the managers that set standards in the organization and if they are not convinced of knowledge importance, their co-workers will probably not pay much attention to knowledge issues as well.

One of the challenges in knowledge management driven leadership is how to develop capacity in other employees by arranging a special climate supporting or even demanding knowledge processes (e.g. acquiring or sharing knowledge) (Nguyen and Mohamed, 2011). Another challenge is connected with guiding staff through "creative collaboration" for the successful realization of tasks (Soriano and Martínez, 2007). One of the tools helping to cope with these challenges is the awareness of knowledge management concept and the ability to introduce it in an organization.

Unfortunately, in small and medium-sized companies managers are often not aware of knowledge management concept. Even if companies from this sector manage their knowledge resources, they often do it being unaware of KM notion and they follow emergent approach (Bolisani et al., 2015). In the light of this, the fact of being acquainted with the KM concept by an SME manager or owner might contribute to his better understanding of knowledge processes and their management. This in turn could influence certain, based on KM, leadership style. Ribiere and Sitar (2003) claim that leadership supports the implementation of knowledge activities in a company and therefore, supports knowledge processes. They suggest that leaders should perceive organization through a knowledge lens and "*establish trust and commitment that will help the knowledge organization to achieve its knowledge and business goals*" (Ribiere and Sitar, 2003).

Taking into account the above, the authors define KM driven leadership as a behaviour exhibited by managers, based on: 1) encouraging employees to create, share and apply knowledge; 2) possessing knowledge on KM concept and 3) providing employees with their time whenever employees need it.

Innovation success

In a constantly changing world, innovation has become an everyday element of organizational life. Economic growth has been affected by the speed of innovation, resulting from the fast pace of technological evolution, reduced product lifecycles and a higher rate of new product creation. Companies must adjust their business strategies to these new requirements and follow innovative approaches to sustain competitive advantage (du Plessis, 2007). To achieve it, firms need to combine their existing knowledge with the newly created one as it can provide them with a better position on the market (Gold et al, 2001). This has become a more complex task due to the explosion of knowledge resources and their growing availability (du Plessis, 2007).

Organizational innovativeness can be defined in a variety of ways – it can denote the intention to be innovative, the capacity to introduce a new product or service, as well as the implementation of processes and systems leading to improved business performance (Dobni, 2008). Innovations themselves are contingent upon employees' knowledge, skill, and experience in the value creation process (Wang and Wang, 2012). They also depend on interactions between individuals (Leonard and Sensiper, 1998). Keeping that in mind, the role of leadership in innovation process should be highlighted (Sarros et al., 2011). Leaders are responsible for the support of innovation by motivating people to exchange their ideas and thoughts openly and collaborate freely. On the other hand, analysis of innovation definitions carried out by Dobni (2008) drove the author to the conclusion that innovation is to high extent contextual and dependant on organizational culture.

Innovation success is grounded in the idea that a firm should be better in comparison with its competitors, for example it should offer more products or services, it should be the first one on the market to introduce them or finally, it should better understand the needs of its customers (Oke et al., 2007).

Culture

Organizational culture is an important aspect of each firm's functioning. It not only helps in integrating daily activities of workers to reach the planned goals, but also supports organizations in adapting to the rapid changes in external environment (Nguyen and Mohamed, 2011). Organizational culture can be referred to as "*the meanings inherent in the actions, procedures, and protocols of organizational commerce and discourse*"(Sarros et al., 2011).

The link between leadership and organizational culture has attracted significant attention not only of researchers, but also of practitioners. It grounds in the assumption that leadership and culture are somehow linked with the overall performance of a company (Ogobonna and Harris, 2000). Zheng et al. (2010) claim though that organizational culture has an indirect influence on organizational effectiveness by affecting the behaviour of organizational members. Following this rationale, it can be stated that culture also shapes the behaviour of leaders. However, as Schein (2004) points out, organizational leadership and culture are interlinked and hardly separated. It is especially true for small and medium sized companies, which are, to high extent, shaped by their founders and certain values, norms and beliefs exhibited by them. Therefore, certain organizational cultures respond to and result from different leadership approaches. In this regard, these are leaders that highly contribute to shaping cultural identity (Sarros et al., 2011).

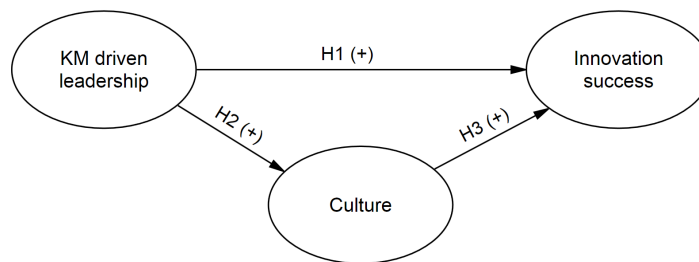
The above literature analysis provides ample support for the following hypotheses formulation:

- H1. KM driven leadership positively influences innovation success.
- H2. KM driven leadership positively influences culture.
- H3. Culture positively influences innovation success.

Additionally, KM-driven leadership shall be a driving force for creating knowledge culture, which in turn shall contribute to innovation success. Specifically, the greater the level of KM-driven leadership in a certain company, the more the firm will develop knowledge culture, which, in turn, will positively influence innovation success. Therefore, we advocate one more hypothesis on the mediation role of culture:

- H4. Culture mediates the relationship between KM driven leadership and innovation success.

Figure 1. Conceptual model



3 Methodology

Sample and procedure

To test the hypothesized model, the authors developed a standardized questionnaire. A total of 400 Polish companies from the knowledge-intensive business services (KIBS) sector were selected and asked to take part in the study. Companies from this particular sector were chosen as the object of the study due to their high knowledge-dependence, knowledge-intensity of services they offer and high innovativeness reported in various studies (e.g. Muller and Zenker, 2001; Czarnitzki and Spielkamp, 2000; den Hertog, P. 2000; Zieba and Zieba, 2014).

The companies were contacted by telephone and an online interview was conducted with an appropriate person during the telephone call. In some cases, the respondents requested a link to the questionnaire, which was sent to them by e-mail. In total 111 companies agreed to take part in the study and answer the questionnaire. For the analysis, it was considered only fully completed questionnaires, thus no data were imputed. The questionnaire was administered in Polish. To ensure that the original items were translated correctly, a back-translation process was used (Craig and Douglas, 2000).

The items used in this study were adapted from relevant literature and measured with a 5-point Likert scale. KM driven leadership was measured using 3 items adopted from Ribi re and Sitar (2003), Wong and Aspinwall (2005) and Kmiec ak et al. (2012). Culture was measured by using 5 items adapted from Wong and Aspinwall (2005). Finally, innovation success was measured by using 3 items adapted from Oke et al. (2007). For the complete list of items and the descriptive statistics please contact the corresponding author.

The profile of the sample was as follows: managers represented 27.9% of respondents, other members of board – 20%, owners – 11.7% and the rest were other key

informants. The median of existence of the companies in the market was 27 years, and the median number of employees was 15.

Measurement procedures

To evaluate the conceptual model it was utilized reflective measurements. Cronbach's alpha and confirmatory factor analysis (CFA) were used to assure the reliability and validity of the measurements. The alpha coefficients were 0.80 for KM driven leadership, 0.84 for culture, and 0.83 for innovation success. All factor loadings ranged from 0.51 to 0.88 exceeding the 0.50 level, as suggested in literature (Hair et al., 2010). There was no evidence of cross-loadings amongst the items. The correlations between the constructs were positive and significant (KM driven leadership – culture: $r = 0.64$; culture – innovation success: $r = 0.50$; and KM driven leadership – success: $r = 0.44$).

To analyse the covariance matrix, all latent variables were included in one a single multifactorial CFA model in AMOS 21.0 software. The maximum-likelihood estimator (ML) was used, and the goodness-of-fit (GOF) of the model was evaluated using the chi-square test statistic, the comparative fit index (CFI), the Tucker–Lewis index (TLI), and the root mean square error of approximation (RMSEA). Values larger than 0.90 for CFI and TLI, and 0.08 or lower for RMSEA indicate good model fit (Hu and Bentler, 1999). The model yielded good GOF values as evidenced by $\chi^2_{(72)} = 123.21$; CFI = 0.92, TLI = 0.90, and RMSEA = 0.08.

To test the hypotheses, we used structural equation modelling (SEM) in AMOS 21.0. During the SEM procedure, the model yielded a good fit as recommended in the literature (Hair et al. 2010). The GOF values were as follows: $\chi^2_{(72)} = 123.21$; CFI = 0.92, TLI = 0.90, and RMSEA = 0.08.

4 Main effects

The first tested hypothesis postulated that KM-driven leadership positively influences innovation success. The model estimates did not support H1 ($\beta = 0.13$; t -value = 0.91; p -value = 0.36), thus H1 was rejected. Considering H2, a positive influence of KM-driven leadership on culture was expected. The results of the model supported H2 ($\beta = 0.30$; t -value = 4.15; p -value < 0.001). Following with the estimations, H3 anticipated that

culture positively influences innovation success. This hypothesis was also supported ($\beta = 0.64$; t -value = 2.45; p -value > 0.001).

Finally, H4 postulated that culture mediates the relationship between KM-driven leadership and innovation success. To test the mediational effects among the variables we followed the preconditions set down by Baron and Kenny (1986) i.e., (i) the predictor variable (KM driven leadership) is significantly associated with the outcomes variable (innovation success); (ii) leadership is significantly associated with the mediating variable (culture); and (iii) culture is significantly associated with innovation success when KM-driven leadership is also included in the model. For the estimation of the mediation, the SEM model was re-estimated with 1000 bootstrapping sample. The results indicated that the direct effect of KM-driven leadership on innovation success (the mediator variable was removed from the model) was positive and statistically significant ($\beta = 0.46$; t -value = 3.47; p -value > 0.001). When the mediator variable (culture) was in the model the value of the direct beta was non-significant (as seen in H1). However, the indirect beta estimation was statistically significant ($\beta = 0.20$; p -value > 0.04). Therefore, culture fully mediated the relationship between KM-driven leadership and innovation success; hence H4 was confirmed. The main effects of the study are summarized in Tables 1 and 2 consequently.

Table 1. Standardized structural coefficients of the conceptual model

Hypothesis	β	t -value	p -value	Acceptance /Rejection
H1. KM driven leadership \rightarrow innovation success	0.13	0.91	0.36	Rejected
H2. KM driven leadership \rightarrow culture	0.30	4.15	***	Accepted
H3. Culture \rightarrow innovation success	0.64	2.45	***	Accepted

Notes: *** $p > 0.001$; $\chi^2_{(72)} = 123.21$; CFI = 0.92, TLI = 0.90, and RMSEA = 0.08; $n = 111$

Table 2. Estimations for the mediation analysis

Hypothesis	Direct β without mediator ^a	Direct β with mediator	Indirect β	Mediation type observed
H4. KM driven leadership - Innovation success	0.46 ***	0.13 (n.s.)	0.20 **	Full mediation

Notes: *** $p > 0.001$; ** $p > 0.05$; Bootstrapping sample = 1000; n.s. = non-significant;^a
GOF values: $\chi^2_{(13)} = 20.71$; CFI = 0.97, TLI = 0.94, and RMSEA = 0.07; $n = 111$

5 Discussion and conclusions

The study provides some evidence on the relation between KM-oriented leadership, culture and innovation-based success of the company. Our findings confirm that culture fully mediates the relationship of KM-oriented leadership with innovation success. Therefore, the study contributes to the understanding of these phenomena in the context of small and medium-sized companies offering knowledge-intensive business services - still a much unexplored topic. In line with other studies, this paper confirms the relation between leadership and innovation success (Sarros et al., 2011; Donate and Guadamillas, 2011; Donate & Sánchez de Pablo, 2014). It also contributes to the development of a conceptual model illustrating relationships between KM-driven leadership, organizational culture and innovation success.

Empirical analysis has shown that KM-driven leadership has a direct influence on culture (H2 was confirmed) and that culture positively influences innovation success (H3 was also confirmed). No direct relation was found between KM-driven leadership and culture – H1 was not supported by the model analysis. This result was quite surprising as in many previous studies leadership has been claimed to influence organizational culture. Perhaps culture is not contingent upon KM-driven leadership, but the relation is reverse, i.e. it is KM-driven leadership that results from culture supporting knowledge processes. This area definitely requires further studies.

To conclude, by building on the previously reported research on leadership, culture, innovation, and knowledge management, we synergistically integrated KM-driven leadership and innovation success while exploring the meditational role of culture in that. The results of the study are significant for both scientists and practitioners. As far as research is concerned, it contributes to the analysis of factors potentially supporting innovation success of companies from the SME sector. The study shows that KM-oriented leadership is indirectly a very important factor helping in the achievement of innovation success by companies. From the point of view of practitioners, the relationships examined indicate the potential areas on which SMEs managers and executives should concentrate to achieve better innovation results.

The study is not free from some obvious limitations. First of all, study results are limited to KIBS companies located in one of the regions in Poland and, as such, they cannot illustrate the overall picture of companies in other countries. Furthermore, the study concentrated on one type of companies (belonging to the KIBS sector) and that is why the application of its results in other sectors should be carried out with certain cautiousness.

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